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Poverty and Unemployment in Spain During the 2008's Financial Crises*

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Abstract

The main objective of this paper is to examine the contribution of high unemployment rate for the increase in level of poverty and income inequality during and after the 2008 global financial crisis in Spain. Secondary household survey data from the European Union data base (EU_SLIC) for 2008 and 2014 was used for the descriptive and inferential statistics. The two years are chosen purposely since 2008 was the year that the global financial crisis was begin, and 2014 was the year that unemployment rate was very high and Spain's economy was starting to revive from the crisis. Binary Logistic regression is used for inferential statistics since the dependent variable (being poor) is a binary variable and basic activity status (with four categorical variables), citizenship (with three categorical variables) and number of workers in the household (as a ratio of total number of individuals in the household) are used as explanatory variables.

Based on the descriptive and inferential statistics results, the contribution of high unemployment rate for the increase in poverty rate and income inequality was high in Spain during and after the 2008 global financial crisis. The probability of being poor for unemployed increases from 0.18 in 2008 to 0.255 in 2014. Being unemployed, being inactive households, and being from other citizens are more likely to poor compared with workers, and local citizens respectively.

Key Words: Poverty, Inequality, Unemployment, Financial crisis, Binary Logit model

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1 Introduction

Spain, which is bordered by France, Portugal, Morocco, Gibraltar and Andorra, was one of the European countries which was affected by the financial crises in 2008. As of 2017 estimation, the total estimated population of Spain is 48.95 million with a growth rate of 0.78 and around 45% of its population is youth. The growth rate of its real GDP was 1.1 %, -3.6% and 1.4% in 2008, 2009 and 2014 respectively which indicates the huge impact of the financial crisis of 2008 on Spain's economy (Eurostat, 2016).

The 2008 financial crisis mainly affects the manufacturing sector specifically the construction industry which took significant proportion of the country's active labour. Due to the collapse of the construction industry, mainly because of the collapse of real state development, the unemployment rate increases from 8.2% of active population in 2007 to 11.3% of active population in 2008 and 24.5% in 2014 which is an increment of 13.2% within 6 years (Eurostat, 2016; C.Y.-Y. Lin et al., 2013).

Since labour is the most important source of income for the households in the country, the highly increment in unemployment rate increases the vulnerability of the households to being poor and to suffer the consequences. Hence, the government of Spain forced to increase its share of social security expenditure from 21.4% of GDP in 2008 to 25.4% of GDP in 2014 (Eurostat, 2016).

Even if the government increases its social security expenditure by more than 4% of GDP, as scholars argue, the highly increment of unemployment and high decrements of per capita income were most drivers of the increment of poverty in Spain during and after the financial crises (Duiella and Turrini, 2014). Herranz Aguayo et al. (2016) also argue that huge increment of unemployment rate was the most influential factor for the growth of poverty rate in Spain during and after the 2008's global financial crisis.

The huge increment of unemployment rate in Spain due to the global financial crises of 2008 makes the country to suffer huge collapse of its economic growth (-3.6 % in 2009) and erodes the funding base of the government directly and increases the demand for welfare (social security) indirectly (Saunders P., 2002; C.Y.-Y. Lin et al., 2013). Hence, the main objective of this paper is to estimate the contribution of high unemployment for the increment of poverty rate in Spain during the 2008's financial crisis. In addition, the comparison and estimation of poverty rate and income inequality for 2008 and 2014

will undertake. The two years are selected purposely since, 2008 was the year that the global financial crisis was started and 2014 was the year that unemployment rate was at its peak point even if the country's economy started to revive from the crises.

2 Variables of Interest, Source of Data and Methodology

To see the contribution of high unemployment rate on poverty rate growth, basic activity status with four categorical variables (Working, unemployed, Retired or give up on business and inactive) is taken as main explanatory variable. The additional variables used as a control explanatory variable are: number of workers in the household (as a ratio of total number of individuals in the household) which is proxied by employment status, and citizenship with three categorical variables (Local or Spanish people, EU citizenship and other citizenship).

For all explanatory variables and for all estimations of poverty and inequality, the data is taken from EUSLIC data base and the data set is 2008 and 2014 cross section survey micro data in household level. The total number of households included in this study in 2008 and 2014 are 35,731 and 31,422 households respectively. To estimate the poverty rate, income inequality using GINI coefficient and other descriptive statistics are undertaken using the disposable household income, gross household income, and total household tax and these variables are equivalized for each member of households based on the OECD weighting methodology which gives a weight of 0.7 for the household head, 0.5 for each additional adults and 0.3 for each children in the household (OECD, 2015). The purpose of equivalizing or weighting the household disposable and gross income is to consider the differences in needs between households, since it is the fact that the need for food by children as an example is less than adults to achieve the same level of nutrition, and that larger households benefit from economies of scale in the consumption of certain goods and services. Equivalence scales also do not allow differences in other aspects of well-being such differences as disability, mortality, literacy levels, schooling attainments between individual or household (Justino, 2005).

Since the dependent variable (being poor) is a binary variable, the Binary logistic regression is used to inference the determinants of poverty in Spain during the financial crisis. The general Binary lo-

gistic regression model is formulated as:

$$Py = P(y = 1|x) = F(X'B) \quad (1)$$

$$Y = \begin{cases} 1 & \text{if yes} \\ 0 & \text{if no} \end{cases} \quad (2)$$

In which. from equation (2), the dependent variable has only two values: the value will be 1 if the answer is “yes” and the value will be zero if the answer is “no”. The probability of something happen will be depend on this values.

And :

$$F(X'B) = \frac{\exp(X'B)}{1 + \exp(X'B)} \quad (3)$$

Where $F(X'B)$ is the cummulative distribution function of the logistic regression; and $X'B$ is the product of the regressors and coefficients of regressors. To control the error terms which includes the other possible determinants of dependent variable, despite of those included, and other possible errors in estimation, the binary logistic regression model can be written as:

$$Y = \beta_0 + \beta_i X_i + \varepsilon_i \quad (4)$$

Where Y is the dependent variable with only two values, X_i stands for the regressors, β_i indicates the coefficients for each regressors and ε_i is for error terms. For this paper in specific, the binary logistic model is specified as:

$$Y = \beta_0 + \beta_1 Un + \beta_2 R + \beta_3 Inc + \beta_4 Oz + \beta_5 Ez + \beta_6 Wr + \varepsilon \quad (5)$$

In which the dependent variable Y is a binary variable with value of being poor or not poor; and Un stands for unemployed members of households, R stands for households members who retired or give up on business, Inc stands for inactive memebtrs in the household, Oz is for other citizens which are working in spain, Ez indicates the EU citizens which are working in Spain, Wr is the number of workers in the household (as a ratio of total number of people in the household), ε is the error term and the rest are coffeints. The explanatory variabels are; basic activity status with four categorical variables (working, unemployed, retired or give up on business and inactive); number of workers in household (as a ratio of total number of individuals in the household) and citizenship with three categorical variables (local (Spanish) citizenship, EU citizenship and other

citizenship). Since basic activity status has four categorical variables, three dummy variables are created using working as a reference. Similarly, since citizenship has three categorical variables, two dummy variables are created using local (Spanish) citizenship as a reference. Dummy variables are created from those two main variables with (n-1) to overcome the multicollinearity problem, as most scholars argue including Salvatore, D and Reagle (2002) . For number of workers in the household the employment status (as a ratio of total number of individuals in the households) is used as a proxy since the data for number of workers in the household is not available in the EU_SLIC data.

3 Descriptive and Inferential Estimation Results

This section discusses both the descriptive summary and statistical estimation results using STATA 14.2 version software. Poverty and inequality comparison in two years (2008 and 2014) and the effect of high unemployment rate on the poverty increment including other determinants of poverty during the 2008's world financial crisis is also discussed.

3.1 Descriptive Summary Statistics

The following two tables show the descriptive summary of annual equivalized disposable income of household, equivalized gross income of household and equivalized tax paid by the household in 2008 and 2014. As we can see from the two tables, the minimum of equivalized tax paid by the household increases from 13993.65 (in negative sign) to 44483.24 (in negative sign) annually which shows the households receive more fund and more social security from the government and hence, the huge increase of the government expenditure on social securities due to the high unemployment after the financial crisis. The other interesting thing from the two tables is that, the mean of both the equivalized disposable household income and equivalized household gross income increased from 2008 to 2014 by 8.5% and 10.6% respectively which shows even if the financial crisis affects the Spain's economy badly (effects will have discussed next pages), the effect was on those vulnerable poor people and the rich people are continuing being more rich.

Table 1: Descriptive Summary in 2008

	Mean	St.Dev.	Min	Max
Equivalized Household Disposable Income	14,311.41	8,629.47	3.3	113,724
Equivalized Household Gross Income	16,888.07	11,106.3	0	132,526
Equivalized Household Tax	8,374.64	9,866.2	-13,993.6	126,320

Souce: Own computation using STATA

Table 2: Descriptive Summary in 2014

	Mean	St.Dev.	Min.	Max
Equivalized Household Disposable Income	15,528.28	10,433.37	0.1	176,422
Equivalized Household Gross Income	18,680.83	14,223.19	0	208,917
Equivalized Household Tax	9,715.8	14,426.1	-44,483.2	245,853

Souce: Own computation using STATA

To see the level of poverty in deeper, the comparison in each age group is better; and hence, in 2008 and 2014, the share of the poor in three age categories (child which are below 18 years age), adults (between 18 and 65 ages) and elders (aging above 65)) is shown in the table below. As we can see from the table, given the poverty line in 2008 and 2014 7,587.63 and 7,995.96 respectively based on the estimation using the data, the share of poor in adults increases by more than 13% in 2014 compared with the share in 2008. This shows that the high unemployment due to financial crisis increases the number of poor adults even if the government increases its expenditure on social security. But the share of poor elders decreases by more than 15% in 2014 compared with share in 2008 probably because of increase in social security expenditure by the government since most of the receivers are elderly people and children even if the share of poor children increases a bit. The overall poverty rate also increases from 20.3% in 2008 to 21.83 % in 2014.

Table 3: Share of Poor (%) in age groups

	2008	2014
Child (<18)	27.77	30.69
Adults (18-65)	44.94	58.29
Elderly (>65)	27.29	11.02
Overall share of poor	20.3	21.83

Souce: Own computation using STATA

The poverty and inequality index are the other descriptive summary statics which used to see the change in poverty and inequality level from 2008 to 2014. Table 4 below shows the poverty and inequality index in 2008 and 2014. The poverty index is mostly measured by the poverty headcount ratio (P0) which shows the percentage of poor from the total population which earn below the poverty line, Poverty Gap ratio (P1) which shows the gap between the income of the poor people and the poverty line, and Squared poverty gap ratio (P2) (OECD, 2015). Here only the headcount ratio and poverty gap ratio are used, and GINI coefficient before and after tax is used to see the change in income inequality. The GINI coefficient before and after tax is used to see how the tax is important to decrease income inequality and to redistribute income for in need.

Based on the poverty line (as given above), both the level of poverty and inequality increases in 2014 compared with 2008. The percentage of poor from the total household increases from 20.3% to 21.83% and the poverty gap ratio also increases by 1.7% which implies the gap between the poverty line and the average income of the poor increases by 1.7% in 2014. The inequality also increases in 2014 compared with 2008 by more than 3.9% after tax.

Table 4: Poverty and Inequality Index

	Poverty Index (%)	Poverty Index	Inequality Index	Inequality Index
	P0(Headcount ratio)	P1(PovertyGapratio)	GINI(pre-tax)	GINI(post-Tax)
2008	20.30	6.0	33.31	30.97
2014	21.83	7.7	37.59	34.05

Source: Own computation using STATA

3.2 Estimation Results and Interpretation

This section discusses and interpret the estimation results ad compare the 2008 estimation results with the estimation results in 2014 to see the main contribution of high unemployment rate for the rise of poverty in Spain during the financial crisis. The estimation results are based on the estimation using binary logit model since the dependent variable is a binary variable (being poor or not poor). As discussed above, the reference categorical variable for basic activity status is “working”, and the reference categorical variable for citizenship is “local citizenship or Spanish”

As table 5 below shows, keeping other explanatory variables constant, unemployed are more likely to be poor compared with workers. In 2008, all explanatory variables have expected sign, in which the person unemployed is, the retired is, the person inactive is, the person with other citizenship or EU citizenship is, the more likely being poor compared to respective references. In 2014, the different thing is that, retired people are less likely to be poor compared with workers and this is probably because of the increase in government expenditure on social security during and after the financial crises since most of the receivers are those retired people. But all other explanatory variables show the same effect as in 2008. The other thing is that, even if the value of Pseudo R² is low, the probability of chi² is highly significant which implies the model is good.

Table 5: Estimation Results with level of Significance

Being Poor	Coefficients	Coefficients
	2008	2014
Unemployed	1.180687***	1.681409 ***
Retired/Giveup business	.8489391***	-.2163078***
Inactive	1.065485***	.8603438 ***
Other citizens	1.094638***	1.748272 ***
EU citizens	.6357287***	.8745561 ***
Employment Status (Ratio)	-.5486587 ***	-.6862367***
Constant	-1.730398 ***	-1.558993 ***
Prob > chi2	0.00	0.00
Pseudo R ²	0.046	0.0909

Source: Own computation using STATA

NB: Coefficients with *** are those which are significant at 1% level of Significance

As of Salvatore, D and Reagle (2002), Multicollinearity is violated when two or more explanatory variables are correlated in the regression model. To see the violation of multicollinearity, a test is undertaken using Variance Inflation Factor (VIF) in STATA to see whether there is interdependence between the explanatory variables in the regression model, and the result shows that there is not problem of multicollinearity since the value of VIF is less than 10.

To see the magnitude of the effect of explanatory variables, specially the effect of high unemployment rate, on the increase in poverty rate, the Average marginal effect is used. As most scholars argue including,

in discrete choice model estimation the marginal effect is used to check the magnitude of the partial effects of explanatory variables. There are two types of marginal effects; marginal effect at mean and Average marginal effect. Both marginal effects give the same result with same magnitude but as scholars argue, using the first one may lead to meaningless interpretation specially when the dummy variable is like gender. Hence, using the latter one, Average marginal effect, is preferable.

Here also, Average marginal effect is used to see the partial effect of unemployment, citizenship and other used control variables on poverty. As we can see from the following table, keeping other things constant, the unemployed people are 18% more likely to be poor compared with workers in 2008 and this percentage increases by 8% in 2014. This increment can probably be due to the high unemployment rate in 2014 which was the effect of the 2008's financial crisis. Other citizens are also 17% more likely to be poor compared with local (Spanish) in 2008, keeping other things constant and the percentage increases by 9% in 2014, which shows how the financial crisis affects the workers which comes from other countries probably labourers since the labour market was hugely affected by the crisis, as discussed above. In citizenship, compared with other citizens, EU citizens are less likely to be poor even if they are more likely to be poor compared with local citizens, keeping other things constant. Table 6

Table 6: Marginal Effects with their level of significance

Being Poor	Coefficients	Coefficients
	2008	2014
Unemployed	.1840331 ***	.2553218***
Retired/Giveup business	.1323237 ***	-.0328463***
Inactive	.1660767***	.1306431***
Other citizens	.1706208 ***	.265475 ***
EU citizens	.0990907 ***	.1328013 ***
Employment Status (Ratio)	-.0855192***	-.104205***

Source: Own computation using STATA

NB: Coefficients with *** are those which are significant at 1% level of Significance

4 Conclusion

In this study, the contribution of high unemployment rate for the increase in poverty rate and income inequality during the 2008 financial crisis analyzed by using the secondary data from Eu _ SLIC Data base for 2008 and 2014 and by applying both descriptive and inferential statistics. The Binary logit model is used to undertake the inferential statistics since the dependent variable (being poor) is a binary variable, and STATA 14 software application is used.

As the results in the descriptive and inferential statistics shows, the contribution of high unemployment rate for the increase in poverty rate and income inequality was high. In categorical age groups for the poverty share, the share of adults increases by 13.35 % from 2008 to 2014 probably due to an increase in unemployment. Being unemployed, being inactive and having another citizenship contributes for being poor. The effect of higher unemployment increases from a 0.18 probability of being poor in 2008 to 0.255 probability of being poor in 2014. Being unemployed, being inactive households, and being from other citizens are more likely to being poor compared with workers, local citizens respectively. Not only poverty rate but also income inequality increases. Generally, During and after the 2008 Global financial crisis, high unemployment rate played a crucial role for the increase in level of poverty and income equality in Spain, and this argument is inline with previous arguments by different scholars.

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